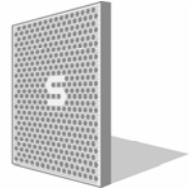


INSTALLATION / OWNER'S MANUAL

Schwank
INNOVATIVE HEATING SOLUTIONS



SCHWANK GAS FIRED STR - JZ SERIES

LOW INTENSITY, TUBE-TYPE INFRA RED HEATERS

WARNING: If the information in these instructions are not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

Do not try to light any appliance.

Do not touch any electrical switch; do not use any phone in your building.

Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier

INSTALLER: Leave this manual with the appliance.
CUSTOMER: Retain this manual for future reference.



SP-MSJR-BX-08C
STR-JZ Manual
RD: NOV 2006
RL: 8C
BA

NOTICE:

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STR-JZ GARAGE & WORK SHOP INFRA-RED GAS TUBE HEATERS

TABLE OF CONTENTS

TOPIC	PAGE NUMBER	TOPIC	PAGE NUMBER
1. GENERAL.....	1	13. ELECTRICAL AND	
2. INSTALLATION IN GARAGES	2	THERMOSTAT WIRING	20
3. PRE-INSTALLATION SURVEY	2	14. HIGH ALTITUDE	
TUBE KIT MATRIX.....	2	INSTALLATIONS.....	20
4. MOUNTING CLEARANCES.....	2	15. LIGHTING INSTRUCTIONS	21
5. SYSTEMS INCORPORATING 90		16. RECOMMENDED	
DEGREE BENDS AND 180-DEGREE		MAINTENANCE.....	21
ELBOWS.....	4	17. OPERATING SEQUENCE.....	22
6. SUSPENSION SYSTEM.....	5	WIRING DIGRAM	23
7. BURNER AND TUBE		18. TROUBLESHOOTING	
INSTALLTION	8	GUIDE.....	24
8. REFLECTOR INSTALLATION	10	19. SPARK IGNITION CIRCUIT	26
9. FLUE VENTING.....	14	20. FLAME SENSING CIRCUT	27
10. COMBUSTION AIR DUCT	16	21. OPTIONAL COMPONENTS	30
11. GAS SUPPLY INSTALLATION.....	17	22. LIMITED WARRANTY.....	33
12. HEATER EXPANSION	19		



WARNING:

- a. Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.
- b. Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition.
- c. Young children should be carefully supervised when they are in the same room as the appliance.
- d. Clothing or other flammable material should not be placed on or near the appliance.
- e. Any safety screen or guard removed for servicing and appliance must be replaced prior to operating the appliance.
- f. Installation and repair should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners and circulating air passageways of the appliance be kept clean.



WARNING:

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

SCHWANK GAS INFRA-RED TUBE HEATER STR-JZ SERIES INSTALLATION INSTRUCTIONS

1. GENERAL

Installation of the **Schwank STR-JZ** Series gas-fired tube heaters must be performed by a qualified, licensed gas fitter and conform to all Schwank heating installation design procedures, including ventilation. All local, provincial and national code requirements must be met, ANSI/NFPA No. 88B 1985 (latest edition), which states clearances to combustible construction or material in storage, from heater and vent, must conform to standard NFPA No. 54 (ANSI Z223.1 latest

edition), in the U.S.A. In Canada, the current CSA-B149.1-00 installation codes for gas-burning appliances and equipment, as well as the Canadian electrical code CSA C22.1.

Schwank STR-JZ Series heaters may be installed for heating of residential indoor spaces. It is beyond the scope of these instructions to embrace all conditions that will be encountered. All system piping must be supported in accordance with acceptable industry practices, local codes, and applicable standards.

If the gas supply to this heater has been shut off by a qualified service technician or gas utility, do not attempt to place the appliance in operation - contact the gas utility or service agency.

This appliance is equipped with a blocked vent shut-off system that will not allow the appliance to operate if an obstruction of the vent occurs.

In the event that this appliance fails to operate, contact a qualified service agency.

The following tube lengths and corresponding BTU input ratings are available:

TABLE 1

MODEL	BTU/HR INPUT ZERO TO 4,500' * ABOVE SEA LEVEL	TOTAL TUBE LENGTH (FT)**	APPROX NET WEIGHT IN LBS
STR-JZ 60-30	60,000	31'	154
STR-JZ 60-20	60,000	21' 4"	111
STR-JZ 45-20	45,000	21' 4"	111
STR-JZ 45-10	45,000	11' 8"	68

* Zero to 2000 ft for the USA (For installations above 2000 ft see orifice Chart on Page 19)

** Manufactured and shipped in 10-ft. lengths, due to the approximate 4" swaged overlap, total length is slightly shorter than multiples of 10 feet.

2. INSTALLATION IN GARAGES

Schwank STR-JZ Series tube heaters are approved for use in garages. The installation must conform to local building codes or, in the absence of local codes, to the standard NFPA No. 54 (ANSI Z223.1 latest edition), in the U.S.A. and the CSA B149.1-00, and CAN1.2.16-M81 in Canada.

In a garage installation, the minimum clearance from the bottom of an infra-red heater to the upper surface of a vehicle shall not be less than the certified clearance to combustible material as indicated on the heater.

3. PRE-INSTALLATION SURVEY

The **Schwank STR-JZ** heating system must have gas piping of correct diameter, length, and arrangement to function properly. For this reason, a layout drawing is necessary.

Carefully survey area to be heated. For best results, whenever possible, place burner and combustion chamber in coldest area.

BURNER & TUBE KIT ASSEMBLY CHART

MODEL: **STR-JZ**

Residential Garage/Workshop Heaters

BURNER KIT FIRING RATE		TUBE KIT PART # & QUANTITY REQUIRED		
		Stand-Alone Kits <u>Only</u>		
		TM- 4510- SX	TM- 1420- SX	TM- 1430- SX
45,000	10'	1		
	20'		1	
60,000	20'		1	
	30'			1

4. MOUNTING CLEARANCES

Schwank STR-JZ Series tube heaters must be mounted with minimum clearances between the reflector surface and combustibles as shown in FIGURE 1, TABLE 2 (page 3).

For recommended heater placement refer to TABLE 3 (page 3).

Heaters should also be located in relation to building construction and equipment, to allowing a minimum clearance of 24 inches from end of burner housing to enable servicing and cleaning of burner, blower and controls.

FIGURE 1 MINIMUM CLEARANCES TO COMBUSTIBLES

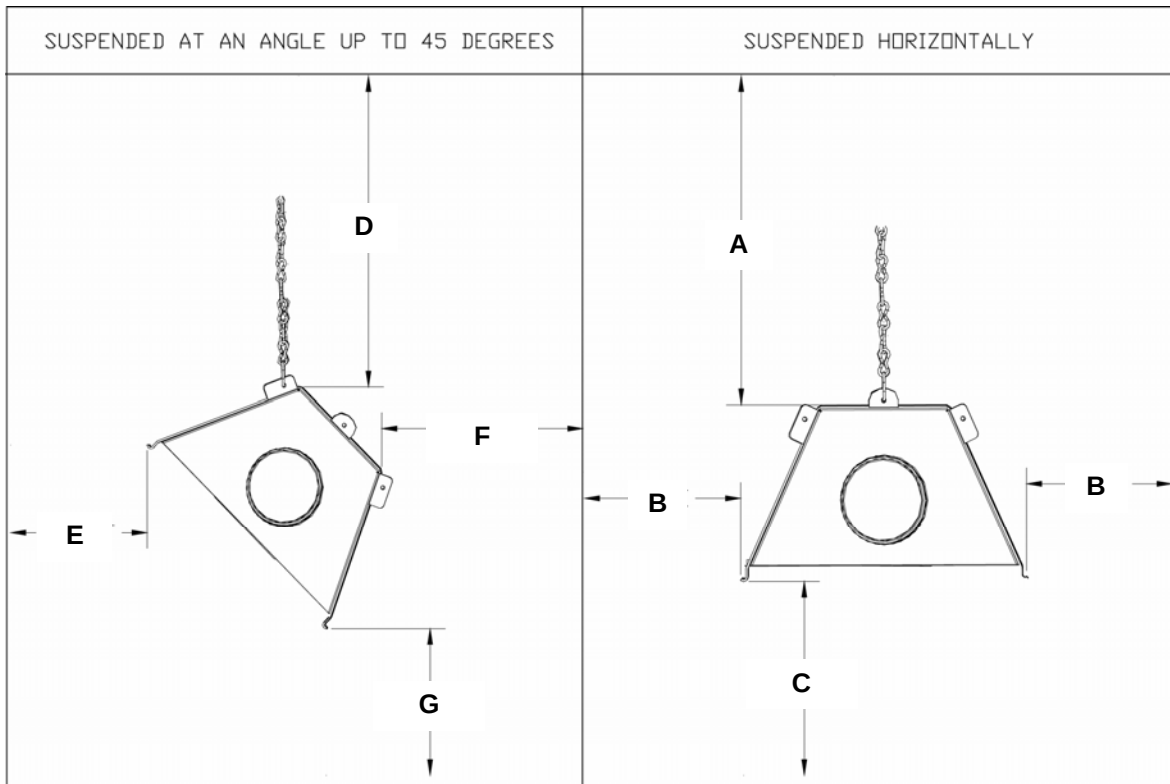


TABLE 2 MINIMUM CLEARANCES TO COMBUSTIBLES**

MODEL	SUSPENDED AT AN ANGLE UP TO 45 DEGREES				SUSPENDED HORIZONTALLY		
	D	F	E	G	A	B	C
STR-JZ 60	1.5"	1"	17"	34"	2.5"	5.5"	34"
STR-JZ 45	2.25"	1"	24"	32"	2.75"	7"	32"

****Clearances are in accordance with local installation codes and the requirements of the gas supplier.**

FIGURE 1B MINIMUM CLEARANCES TO VENT TERMINAL

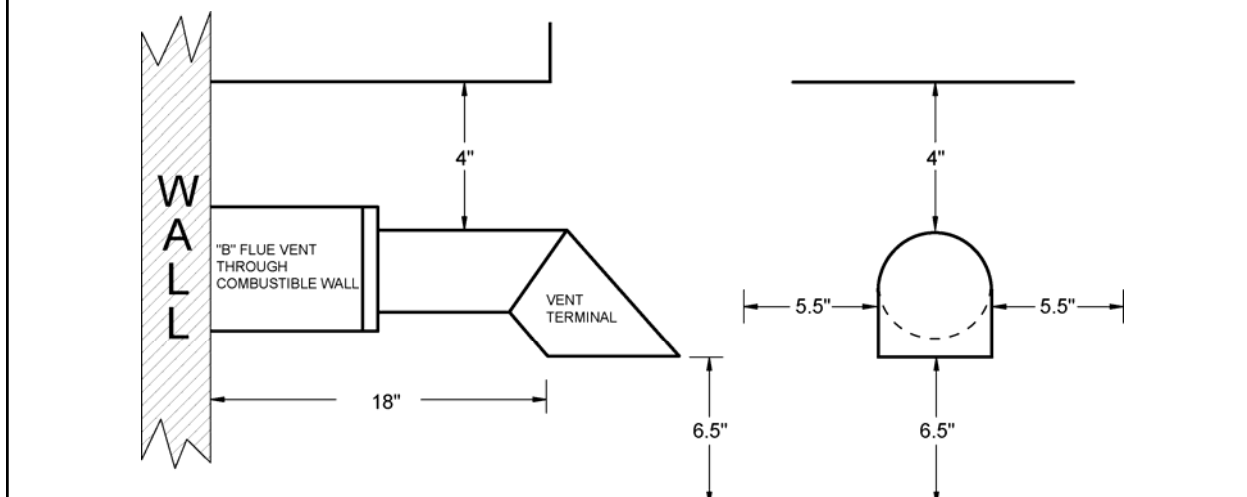


TABLE 3 RECOMMENDED HEATER PLACEMENT

MODEL	MOUNTING HEIGHTS (FEET)	MAXIMUM DISTANCE BETWEEN HEATERS (FEET)	DISTANCE – OUTSIDE WALL TO HEATER LONG AXIS PARALLEL TO WALL (FEET)	
			HORIZONTAL	ANGLE
STR-JZ 60	8 - 14	25	11 – 15	COMBUSTIBLE CLEARANCE
STR-JZ 45	6 - 10	20	8 – 12	

IMPORTANT: Continuous operation of single or multi-heater placement must not cause any combustible material in storage to reach a temperature in excess of 160°F.

5. SYSTEMS INCORPORATING 90° BENDS AND 180° ELBOWS

The **STR-JZ** Series radiant tube heater can be installed in configurations as illustrated in FIG: 2 (below) with a maximum of two 90° or one 180° elbow per heater. The use of radiant elbows reduces the total maximum vent allowable. See SECTION 9 (page 13): **Flue Venting**.

The 90° elbows are shipped as a kit with one coupler, one reflector and one plate hanger, for 180° elbows you must order 2 x 90° kits. An optional angle mounting elbow kit is also available and must be ordered with elbow kits. The Reflectors must be secured to each of the plate hangers, See FIG: 6 (PAGE 6).

IMPORTANT: On STR-JZ 60 and 45 models, a minimum of 10' of straight radiant tube must be connected to the burner before any elbow.

FIGURE 2 SYSTEM CONFIGURATIONS

System Configuration

- 1 Straight line
- 2 "U" tube with 180-degree elbow kit
- 3 "L" tube with 90-degree elbow kit
- 4 Twinned tubes into common TEE flue vent

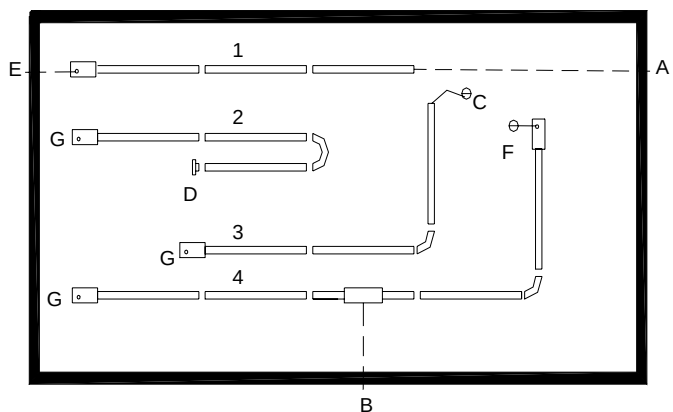
Venting and Combustion Air Options

Flue Vent:

- A Through wall 4"
- B Through wall or roof 6"
- C Through roof
- D Into building, exhaust fan interlocked with heater

Combustion Air Intake:

- E from outside through wall
- F from outside through roof
- G from inside building



6. SUSPENSION SYSTEM

- 1) Survey the available structural supports, considering the system configuration and heat requirements of the area to establish the optimum heater location.
 - a) Locating a heater directly under joists or beams, or installing supplemental steel support rail or angle iron can substantially reduce labour and materials
 - b) Consider that the heater will expand in length approximately $\frac{1}{2}$ to 1 inch for every 10 ft of system length – the greater the firing rate, the greater the expansion
 - 2) Tube system hangers must be located: 1) in line; 2) at a common height with the tube system level; and 3) approximately 116" apart.
 - a) NOTE: It is important that the tubes in the system are installed in alignment horizontally (level) and vertically (in line) – this will help prevent tube separation
 - 3) #8 Jack Chain or equivalent is recommended for suspending the heater
 - a) Connect the chain to the structure using hardware as illustrated in FIGURE 8 or by other mechanically sound means
 - b) If rigid devices such as rods are used for suspension, swing joints or other means must be provided to allow for system expansion (approximately $\frac{1}{2}$ inch to 1 inch for every 10 ft of system length).
 - 4) Two types of hangers are provided to suspend the tube system – see FIGURES 3 & 4
 - a) Plate hangers support the tubes and reflectors at each end of the tube system
 - b) Webbed hangers support tubes and reflectors at each tube junction
 - 5) Please NOTE that each hanger has a 'flat' side and a 'cavity' side – FIGURE 3
 - a) Starting at the burner end of the heater: all hangers except the last plate hanger are oriented with the cavity side of the hanger facing toward the burner end
 - b) The cavity side of only the vent end plate hanger faces the vent - FIGURE 3
- Proceed to section "9. Burner and Tube Installation"

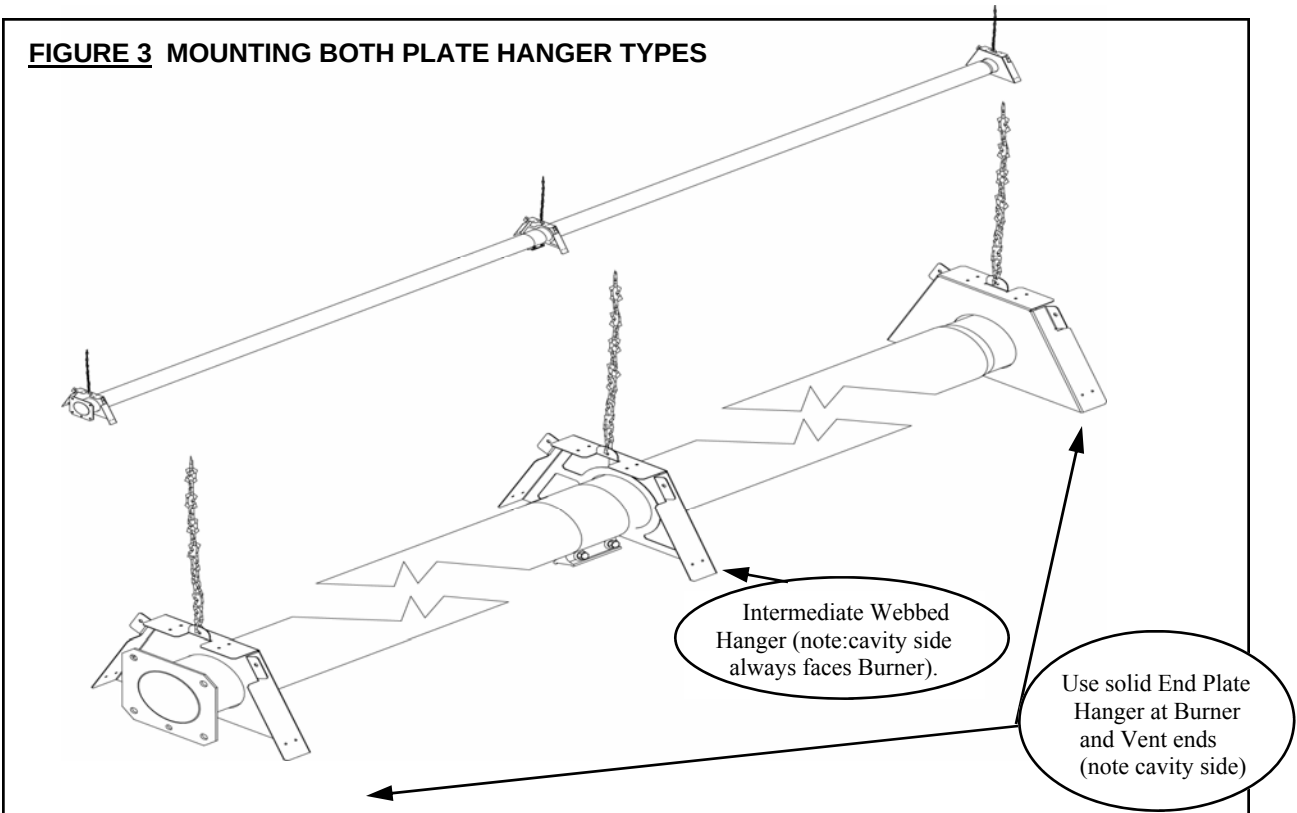


FIGURE 4 TYPICAL HANGER & SUPPORT SPACING RECOMMENDATIONS

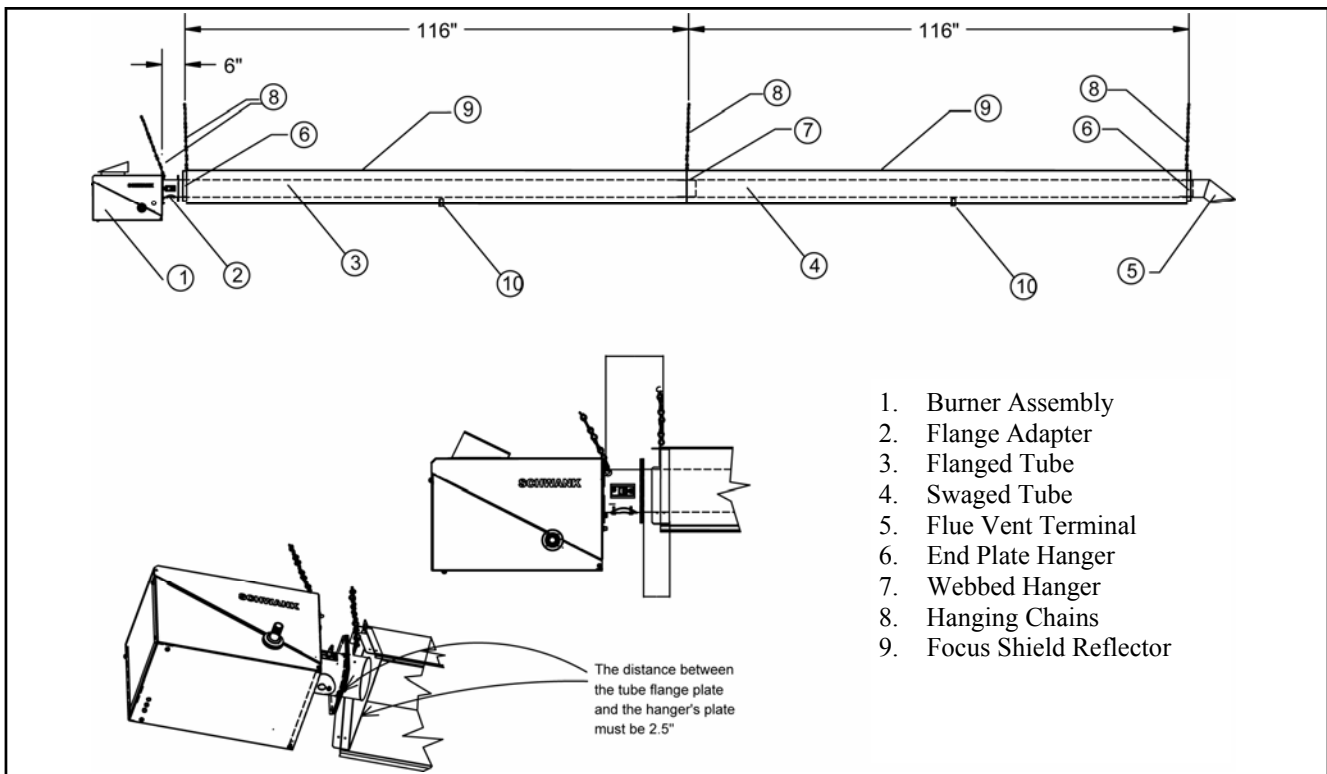


FIGURE 5 REFLECTOR STABILIZER

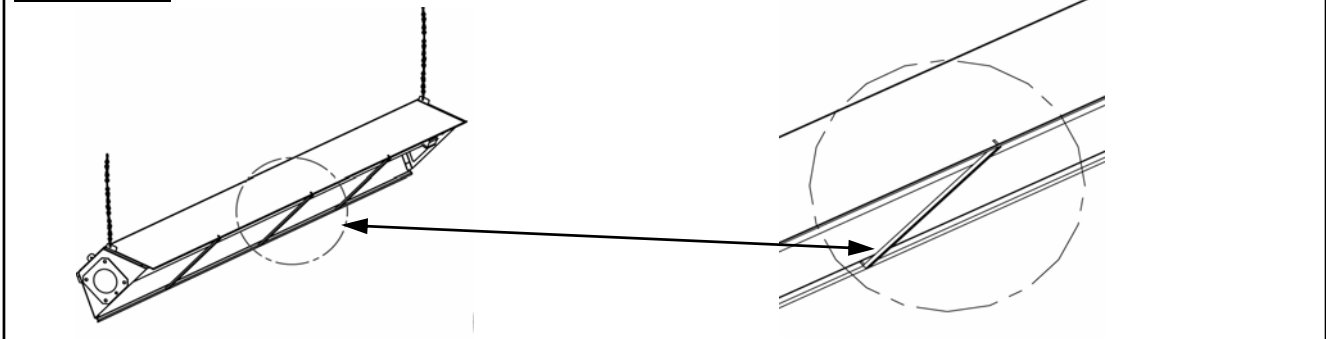


FIGURE 6 PLATE HANGER/ELBOW INSTALLATION

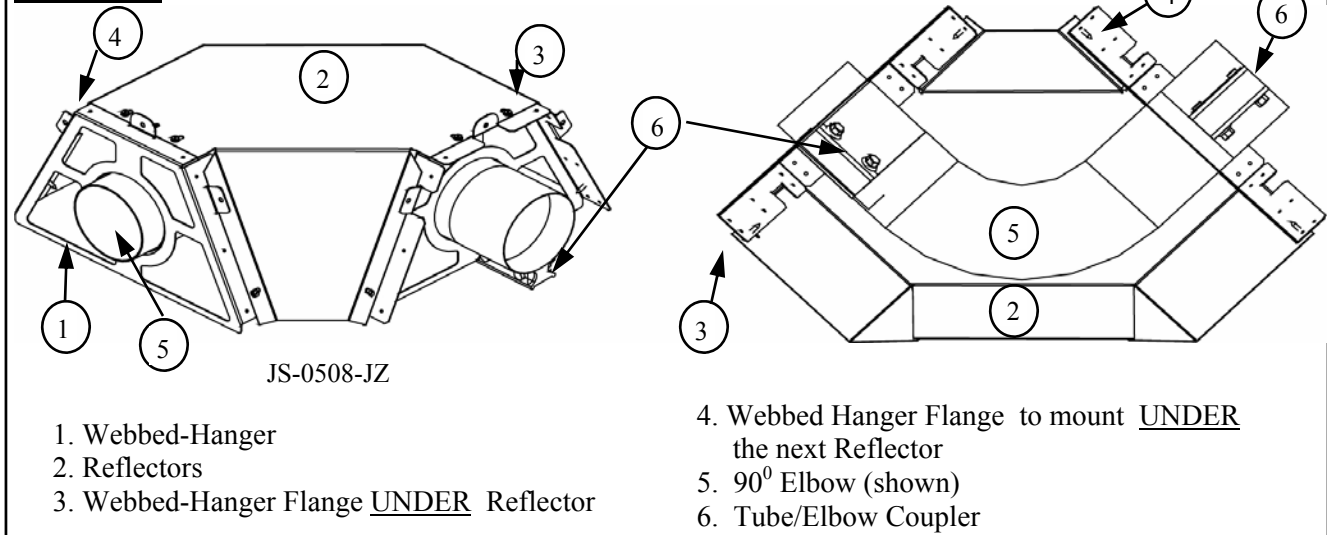


FIGURE 7 HANGER / REFLECTOR ORIENTATION HORIZONTAL TO 45°

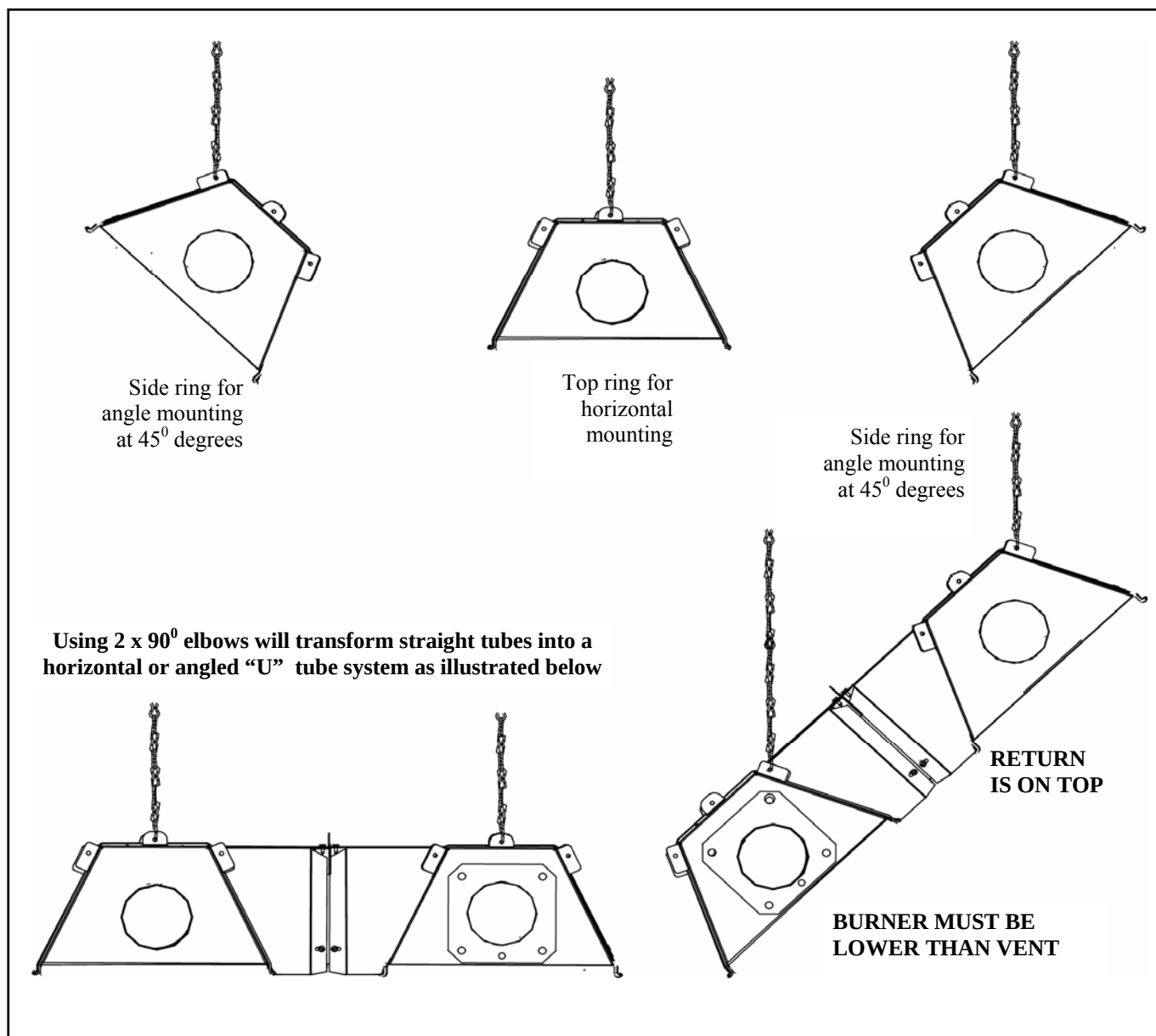
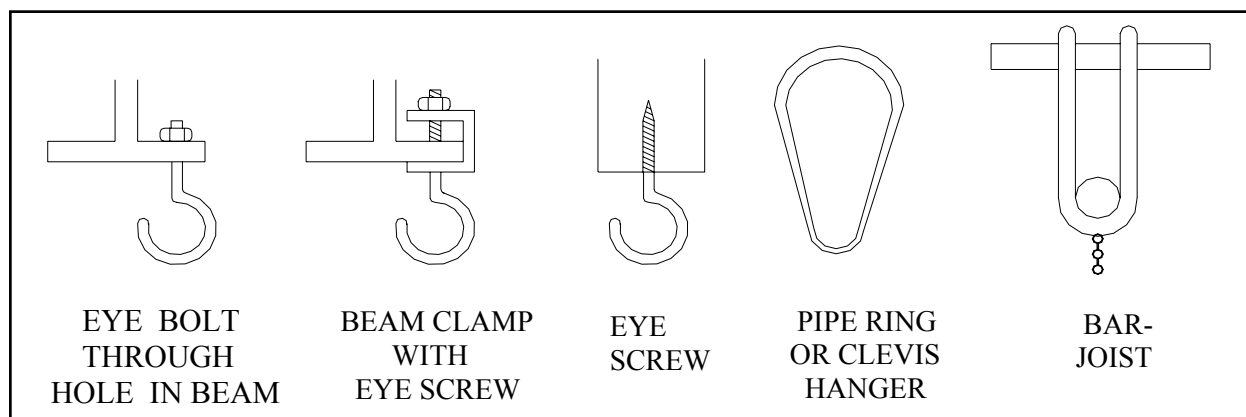


FIGURE 8 SUGGESTED MOUNTING HARDWARE



9. BURNER AND TUBE INSTALLATION

PRIOR TO PROCEEDING with the tube installation:

Refer to section “8. System Suspension”

If a 90° or 180° elbow is to be installed in the system, refer NOW to the Elbow Kit installation instructions supplied with the elbow kit

NOTE: If a turbulator is required in the system, it is factory installed inside clearly labelled tube(s) with instruction as to where the tube(s) must be installed at the vent end of the system

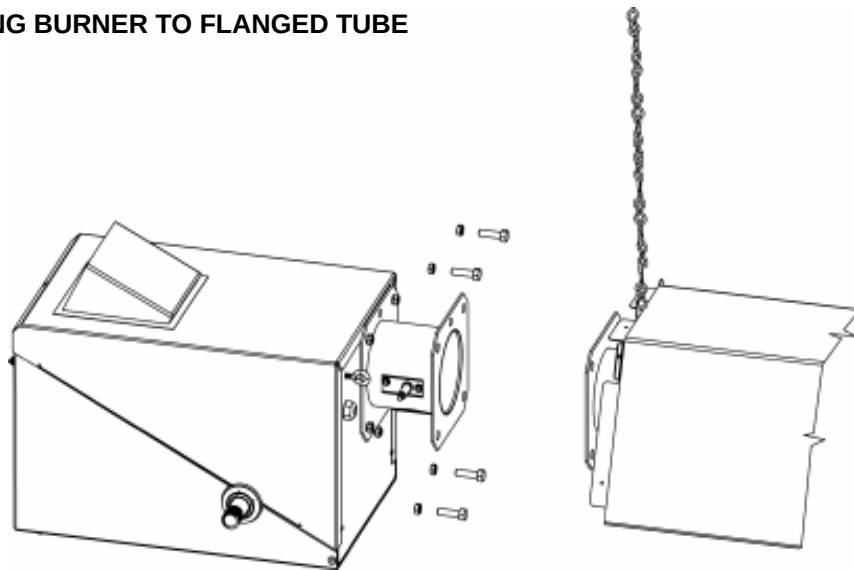
- 1) All hangers must be:
 - a) Suspended at the same height = horizontal alignment of tubes
 - b) In a straight line = vertical alignment of tubes
 - c) Spaced 116” apart = correct spacing for reflector attachment
 - d) Oriented with the “cavity side” facing the burner end of the system (except the last plate hanger at the vent end = the cavity side faces the vent)
- 2) Insert the swaged end of the first tube (tube with flange) through the 4” hole in the first plate hanger – FIGURE 3
 - a) Ensure the ‘cavity’ side of the hanger faces the burner end of the system
 - b) Slide a Torctite tube coupler past the swage onto the tube
 - i) The final position of the coupler will be on the ‘burner-end’ side of the hanger
 - c) Guide the tube into the second hanger (webbed) – ensure the cavity side of the hanger faces the burner end of the system
 - d) Position the first plate hanger 2 inches from the tube flange – this will ensure access to bolt the burner to the flange
 - e) Check that the first tube is level
- 3) Install a focus shield reflector over the first tube - secure with sheet metal screws to the hanger at each end
- 4) Install three reflector stabilizers on the bottom of the reflector
 - a) Equally space stabilizers with one at the reflector center point
 - b) Firmly bend the end tabs on each stabilizer up over the ‘trough’ at each side of the reflector
- 5) Slide a Torctite tube coupler past the swage onto the next tube to be installed
- 6) Insert the swaged end of the tube into the next hanger to support its weight
- 7) Slide the female end of the second tube over the swage of the first tube
 - a) Ensure that the swage on the first tube is fully inserted into the second tube
 - b) Adjust the hanger so that it is located on the second tube, approximately 2” from the end of the tube – in this location the hanger supports both tubes.
 - c) Slide the Torctite coupler into position across the center of the joint
 - d) IMPORTANT: TIGHTEN THE COUPLER BOLTS TO 40 FT-LBS
 - e) The coupler is now in place on the ‘burner-end’ side of the hanger

- 8) CHECK THAT THE SECOND TUBE IS LEVEL, ALIGNED HORIZONTALLY AND VERTICALLY WITH THE FIRST TUBE – MAKE ADJUSTMENT AT SUSPENSION POINTS AS REQUIRED
- 9) Install the reflector over the second tube fastening to the hangers at each end
- 10) Repeat the previous steps assembling one section of tube and reflector at a time until the system is complete
- 11) ENSURE THAT THE SYSTEM IS LEVEL AND THAT ALL TUBES ARE ALIGNED HORIZONTALLY AND VERTICALLY – MAKE ADJUSTMENT AT SUSPENSION POINTS AS REQUIRED
- 12) Mount the Burner to the first tube flange using the four nuts and bolts provided
 - a) TIGHTEN THE BOLTS IN AN OPPOSITE CORNER SEQUENCE AND ENSURE THAT THE BURNER IS IN HORIZONTAL ALIGNMENT WITH THE TUBE
- 13) The ‘center of gravity’ of the burner is slightly off-center to the tubes. So, in order to prevent side rotation of the burner:

Install a support chain from the eye hook on the burner to a point approximately 8 to 10 inches away (towards the burner) from the first tube hanger

 - i) DO NOT fasten the chain from the burner to the first hanger suspension point
 - a) ii) The chain will angle back over the burner and allow “straight back” movement of the burner when the system heats up and expands

FIGURE 9 BOLTING BURNER TO FLANGED TUBE



- Align the four bolts through the flange adapter on tube flange, secure tightly with lock washers and nuts
- Do not loosen or remove fifth nut (#1) directly below burner cup
- Secure suspension chain to eye hook in order to stabilize burner with chain in angled position

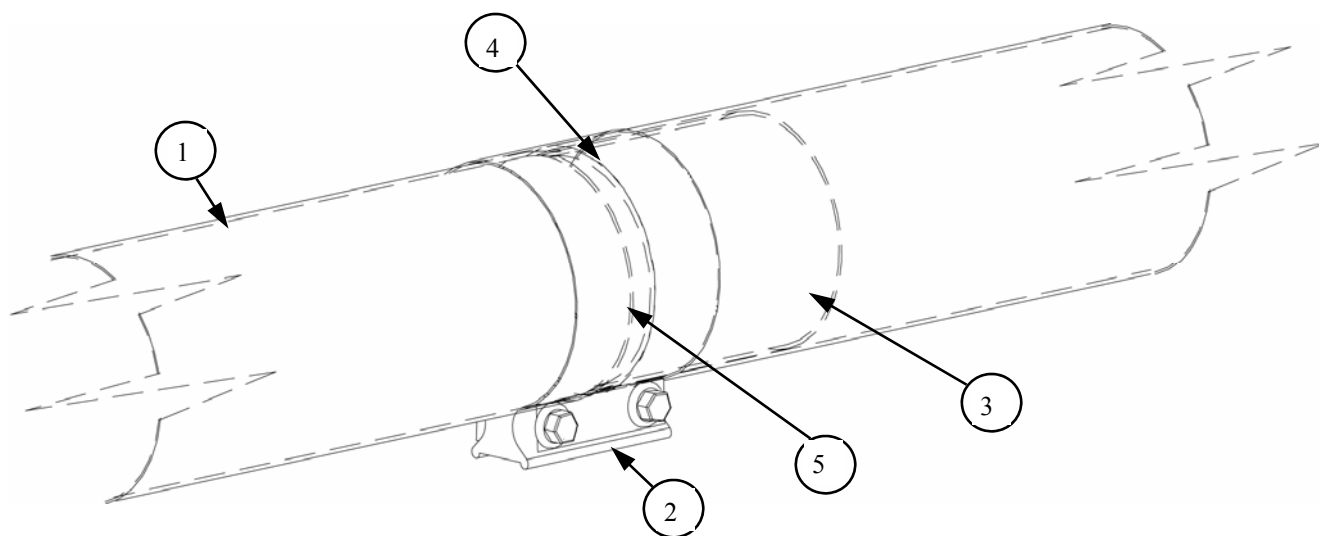
HEATER SHOULD BE SPACED AWAY FROM A WALL OR OBSTRUCTION THAT WOULD RESTRICT OR LIMIT ACCESS TO THE SIDES OF THE BURNER PANEL FOR SERVICE OR REPAIRS.
(SEE PRE-INSTALLATION SURVEY AND MOUNTING CLEARANCES)

TABLE 4

MODEL	TURBULATOR LENGTH
STR-JZ 60-30	14' 0"
STR-JZ 60-20	14' 0"
STR-JZ 45-20	14' 0"
STR-JZ 45-10	5' 0"

NOTE: Where required, the STR-JZ Series Heaters will be supplied with turbulators, factory installed into the **end tube (s)** of the system configuration.

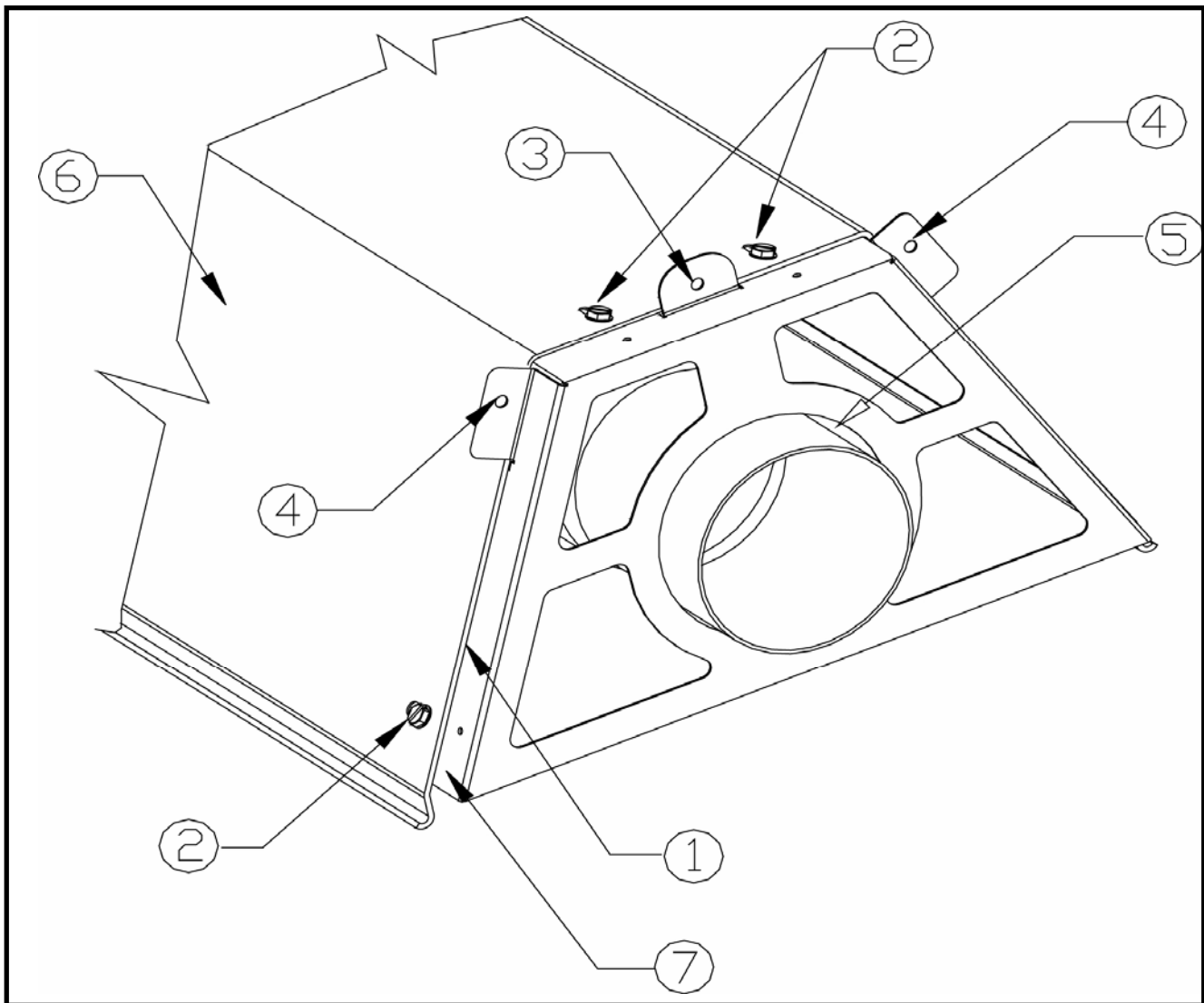
FIGURE 10 COUPLER



1. Tube
2. Tube Coupler
3. Swaged section of tube
4. Point at which the Swaged tube slides into other section of tube
5. Line of the joint

Once the two tubes are joined together, place the centre of the Coupling over the line of the joint and torque to 40ft/lbs.

FIGURE 11 MOUNTING FOCUS SHIELD REFLECTOR TO PLATE HANGER



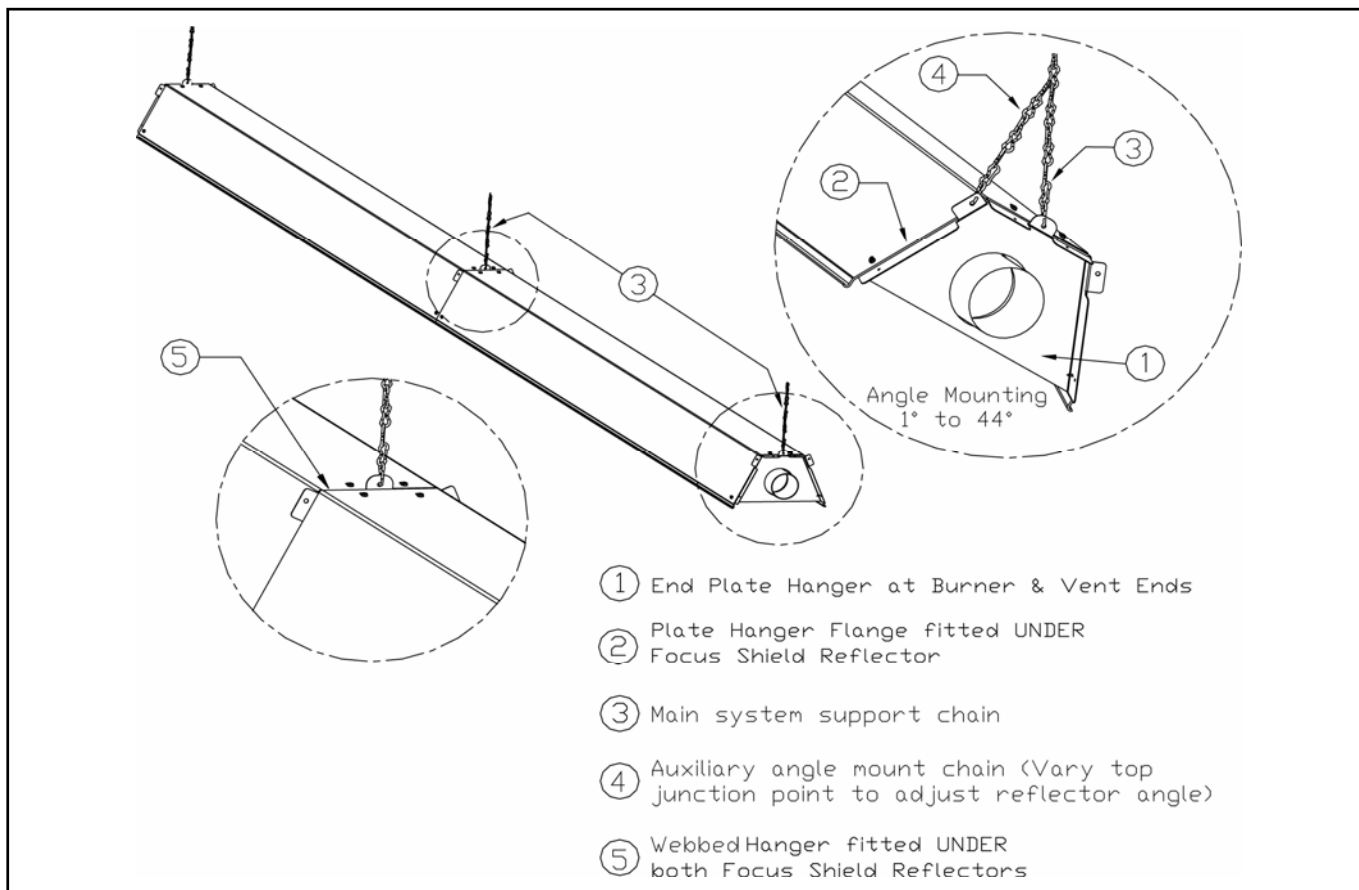
- | | |
|---|--|
| 1 Webbed Hanger Flange under Reflector | 5 Opening for Tube |
| 2 Screws to secure Reflector to Plate Hanger. | 6 Reflector |
| 3 Chain Hole for horizontal suspension | 7 The following Reflector will mount <u>over</u> |
| 4 Chain Hole for 45° suspension | and <u>onto</u> this side of the Webbed Hanger. |

NOTE: For suspension between 1° and 44°, use both suspension points 3 and 4 (see details Fig.15 on Page 13).

8. FOCUS SHIELD REFLECTOR INSTALLATION

The focus shield reflector system can be adjusted to either side, up to 45° from horizontal. SEE FIGURE 12 (PAGE 11), FIGURE 7 (PAGE 7) Note that for both horizontal and angle mounting, the tube must be level along its length. Improper mounting can result in overheating of controls and combustible materials. Use only non-combustible mounting hardware.

FIGURE 12 HANGER ARRANGEMENTS



NOTE: Except for the vent end plate hanger, all hangers must be installed with the cavity side facing the burner end of the system - the cavity side of the vent end hanger must face the vent

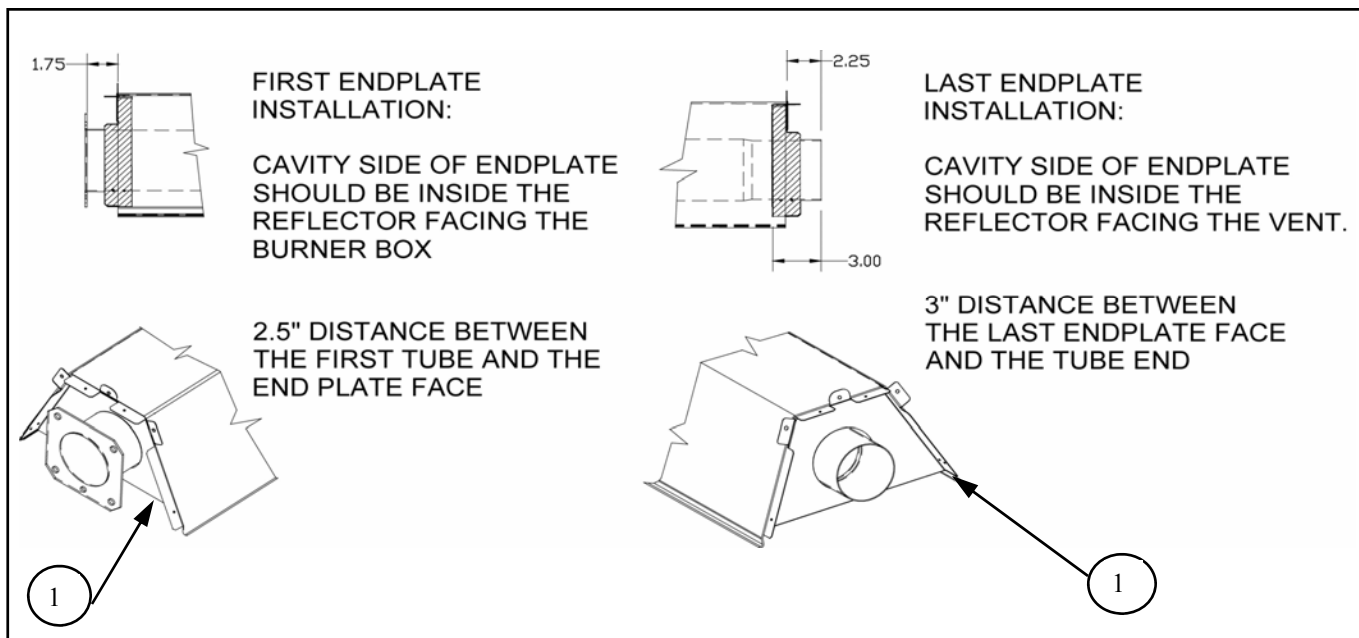
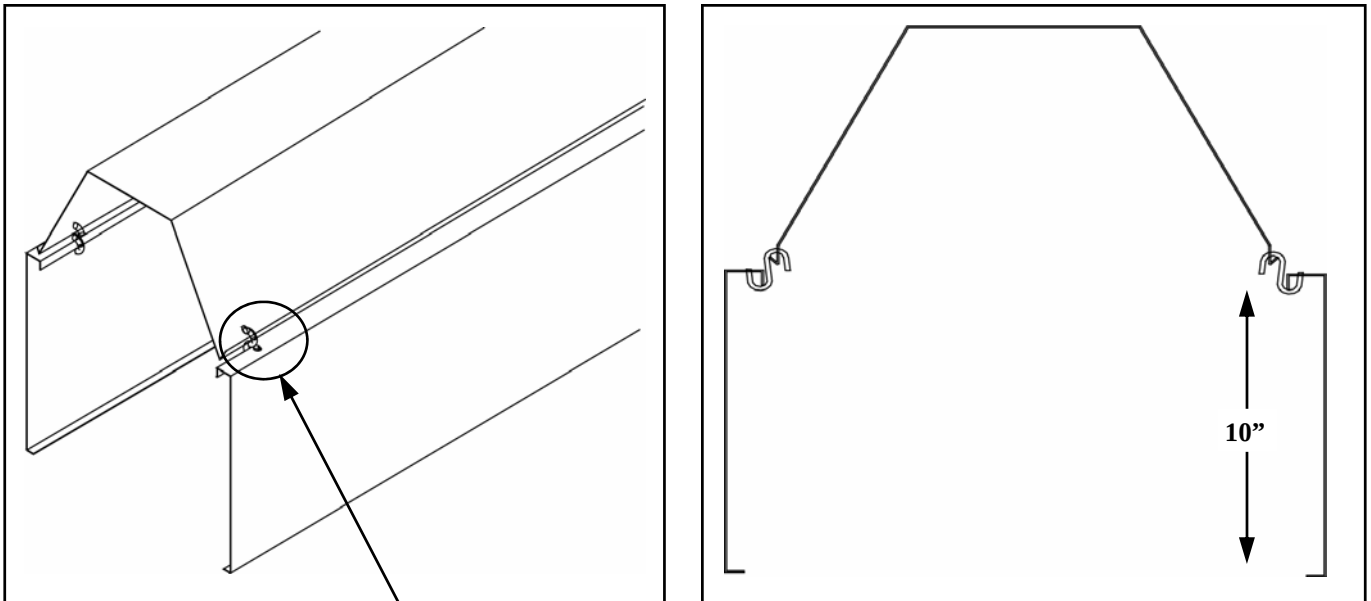
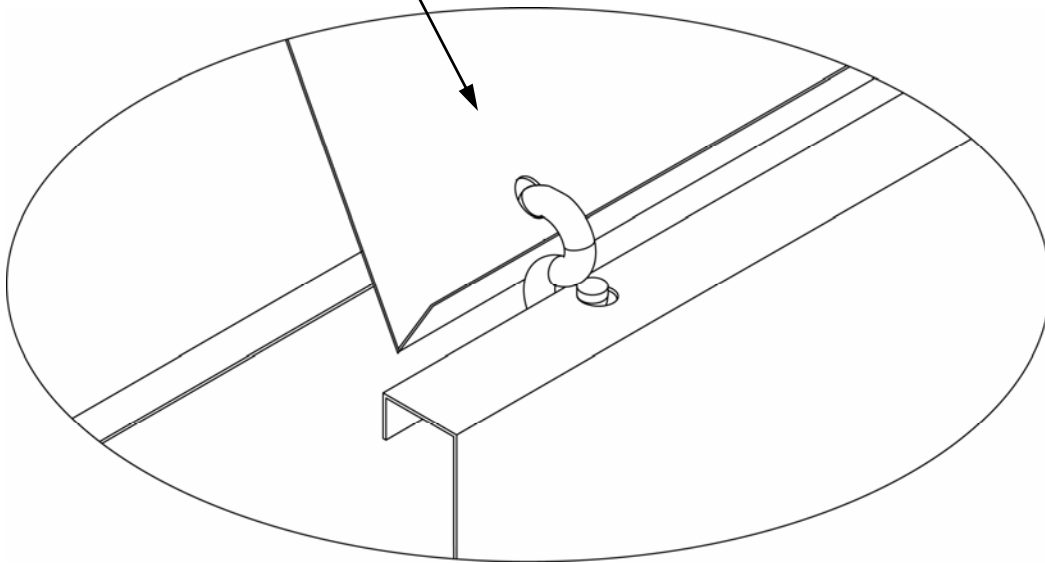


FIGURE 13 REFLECTOR EXTENSIONS (OPTIONAL - IF REQUIRED)



Using "S" Hooks attach the two
Reflectors.
Make sure "S" Hooks are closed



9. FLUE VENTING

THIS STR-JZ SERIES IS APPROVED FOR DIRECT VENTING APPLICATIONS. THE SYSTEM MUST NOT BE OPERATED WITHIN A NEGATIVE AIR CONDITION, UNLESS COMBUSTION AIR IS BROUGHT IN FROM OUTSIDE DIRECTLY TO THE BURNER. IF A SEVERE NEGATIVE PRESSURE IS EXPERIENCED OR ANTICIPATED, THE SECOND PORT (BARB) ON THE BLOCKED FLUE SWITCH SHOULD BE CONNECTED DIRECTLY TO OUTSIDE AIR USING 1/4" PLASTIC HOSE FROM BLOCKED FLUE SWITCH TO OUTSIDE OF BUILDING (NOT SUPPLIED).

DIRECT VENTED APPLICATION

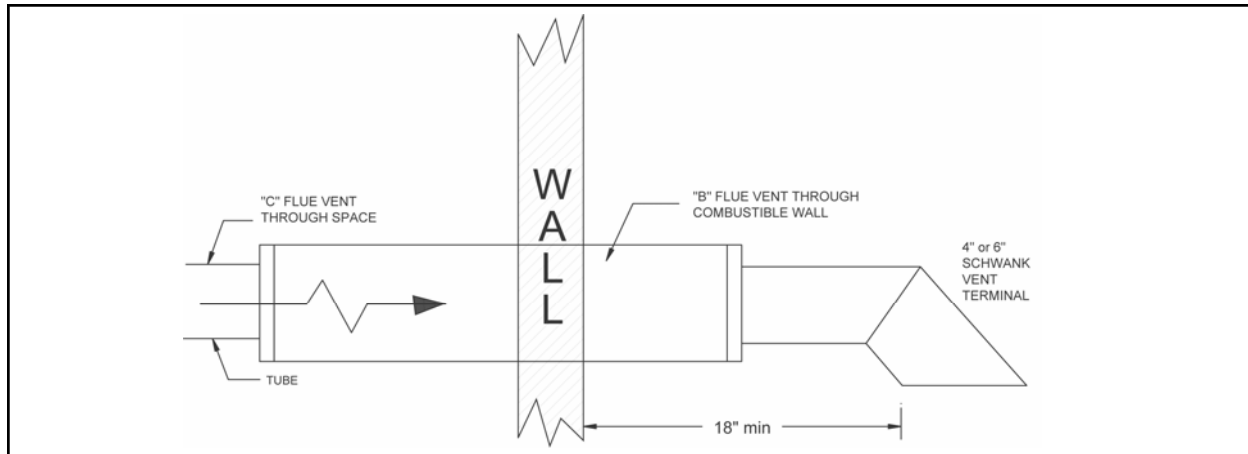
A minimum 6" length of single-wall 'C' Vent is to be installed on the swaged end of the last tube before any Tee or Elbow is fitted. All venting must be single wall "C" vent except that portion of vent passing through a combustible wall or roof then type "B" vent may be used as per CSA's interim requirement. When venting horizontally, the flue vent system must slope downwards approximately 1/4" per foot toward the vent terminal, starting at the termination of the radiant tube. For horizontal through the wall venting, the approved manufacturer 4" or 6" horizontal wall vent terminal (JA-0528/9) should be used and mounted 18" from the outside wall to the inside edge of terminal opening to alleviate back pressure caused by turbulent wind conditions (See Fig 17). This will also ensure flue gases are directed away from the structure to protect building materials from degradation by the exhausted flue gases. It is the responsibility of the installer to be familiar with current local codes or ANSI Z223.1 / CSA.B149.1-00 latest editions for all venting requirements, and practices.

The heater is designed to operate with single wall 4" diameter 26 gauge minimum exhaust vent.

When vent and combustion air are taken through the roof, the exhaust vent should always terminate

higher than the combustion air intake, to prevent recycling the products of combustion back into the heater.

FIGURE 17



The total maximum allowable combined length of vent and combustion air duct is 50' for STR-JZ 60 and 45. Total maximum allowable combined vent and duct is reduced by ten feet for every 90° elbow installed in the vent or duct. Should the tube system be installed with a 90° or with a 180° elbow in the radiant tube, 10 ft or 20 ft respectively must be deducted from the length of vent and duct. Neither the individual flue vent nor the combustion air duct is to exceed 50 ft in length. Exceeding the allowable lengths may create condensation problems and will void CSA Design Certification. The horizontal flue vent shall not terminate less than the following guidelines except where indicated in brackets:

One foot above grade level, unless its location is adjacent to public walkways, then it has to be not less than seven feet.

Must be installed to prevent blockage by snow and protect building materials from degradation by flue gases.

Directly below a soffit or over- hang.

Directly above a gas utility meter or service regulator.

Twelve inches from combustion air inlet of any heater with input up to 100,000 Btu/hr.

Three feet from combustion air inlet of any heater over 100,000 BTU.

Within six feet of a mechanical air supply inlet to any building.

Twelve inches from sides and bottom and eighteen inches from top when installed close to the corner of a building.

As an Option, two heaters may be vented through an approved common 4" X 4" X 6" Vent Tee, supplied by the distributor. The two heaters must then be controlled by a single common thermostat or "ON/OFF" switch.

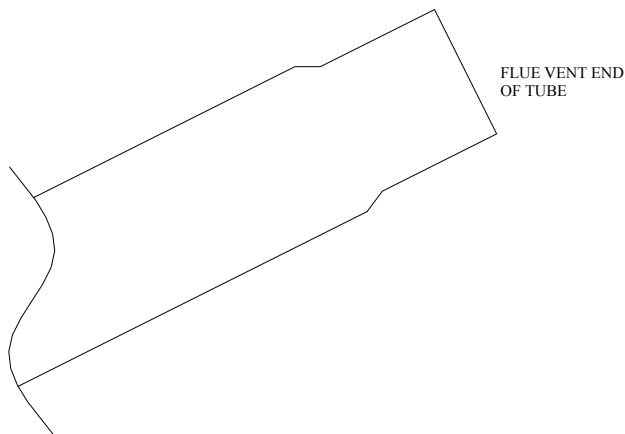
All vent pipe with a slip-fit connection must be mechanically secured. A length of 'C' Vent is to be installed on the swaged end of the last tube before any Tee is fitted.

Where the vent pipe passes through areas where the ambient temperature is likely to produce condensation of the flue gases, the vent pipe shall be insulated with a suitable material as approved and specified by the insulation manufacturer. Check with Schwank Technical Support as to the maximum vent temperature requirements.

The vent system **always** must be adequately supported to prevent sagging.

(See Fig 4 Page 6)

FIGURE 13 FLUE VENT CONNECTION



For Direct and Indirect Venting it is recommended to install a length of 'C' Vent onto the end of the last tube before any fittings are installed. The "C" Vent connection should be slipped onto the tube and positioned approx 6" beyond the swage portion of the 4" tube and must be secured with sheet metal screws.

PLEASE SEE SECTION 12: HEATER EXPANSION (PAGE 18).

10. COMBUSTION AIR

Where heater is operated in a negative air condition or in contaminated air atmosphere such as woodworking shops, air for combustion must be ducted from outside to intake flange on blower. The total maximum combined length of vent and combustion air duct is 50' for STR-JZ 60 and 45. Neither the individual flue vent or combustion air duct is to exceed 50'. The total maximum allowable combined vent /air duct is reduced by ten feet for every 90° vent elbow installed.

The Manufacturer recommends that the STR-JZ be installed with 4 inch diameter combustion air duct to draw combustion air from outdoors. If combustion air duct is not installed, this heater requires a minimum 15 cfm of air for combustion purposes. Allow 5 square inches of open free area to provide adequate combustion air.

Do not install filters on the combustion air intake.

For ease of installation, this heater is complete with a fresh air intake duct hood. It can be used as an outdoor intake hood to bring combustion air to the heater from outside. If drawing in fresh air from outside, it is recommended as per common Engineering practice, that any single wall pipe exposed to cold air must be insulated to prevent condensation. If heater is being vented horizontally through the wall and combustion air is ducted in from outside to the Burner, it is advisable to create a trap at the Burner. The trap is created by dropping the pipe below the level of the tube (much like a plumbing trap using elbows or a flexible connector) before connecting it to the fresh air intake on top of the Burner box, **Do not use flexible dryer hose** for air inlet duct, the corrugated sides of this tubing add too much restriction to the air flow. A good quality industry approved insulated flex is allowed.

Minimum air intake inlet distances:

- Three feet above grade
- Twelve inches from flue vent terminal of heaters with input up to 100,000 Btu's/hr.
- Three feet from flue vent terminal of any heaters over 100,000 Btu/hr.

CAUTION:

In installations where chlorinated Hydrocarbons are in use, such as Trichloroethylene or Chloroethylene Nu it is essential that combustion air be brought in from non-contaminated areas. Burning the fumes from these gases will create Hydrochloric acid fumes, which are detrimental to humans, equipment and buildings. Typical sources of other contaminants are paint removers, paints, refrigerants, solvents, adhesives, degreasers, lubricants, pesticides, etc.

11. GAS SUPPLY INSTALLATION

It is recommended that a locally approved flexible connector supplied by **Schwank** be installed between the heater and gas piping.

The heater must be isolated from the gas supply piping system by closing its individual manual shut off valve (supplied by installer) during any pressure testing of the gas supply piping system.

CAUTION:

If a rigid gas pipe connection is made, then compensation for normal gas supply pipe expansion, and radiant tube expansion must be provided. All piping must conform to local codes.

SEE SECTION 12: (PAGE 18) HEATER EXPANSION

DO NOT use pressures greater than 1/2 psig. to pressure check the heater.

TEST FOR LEAKS: All gas piping and connections must be tested for leaks after the installation is completed.

Apply soap suds solution to all connections and joints and if bubbles appear, leaks have been detected and must be corrected. **DO NOT USE A MATCH OR OPEN FLAME OF ANY KIND TO TEST FOR LEAKS. NEVER OPERATE THE HEATER WITH LEAKING CONNECTIONS.**

The supply system should be checked first with heater turned "OFF" followed by another check with heater turned "ON".

IMPORTANT:

The minimum supply-line pressure at the inlet to the heater regulator must not, in any instance, be lower than 5.5 inches of water column pressure for natural gas and 11.0 inches of water column pressure for propane gas. The supply line gas pressure must be checked with all the heater (s) operating.

Installation of a gas line (trap) "drip leg" is required at the inlet connection tee following the pipe drop to the heater. Failure to provide a "drip leg" could result in condensation and foreign matter passing into the gas valve. Failure to install a "drip leg" in the gas line will void the warranty.

TABLE 5

GAS TYPE	LINE PRESSURE INCH WATER COLUMN		MANIFOLD PRESSURE INCH WATER COLUMN AT-TAP IN GAS VALVE
	<u>MINIMUM</u>	<u>MAXIMUM</u>	
Natural Gas	5.0	14.0	3.5
Propane	11.0	14.0	10.0

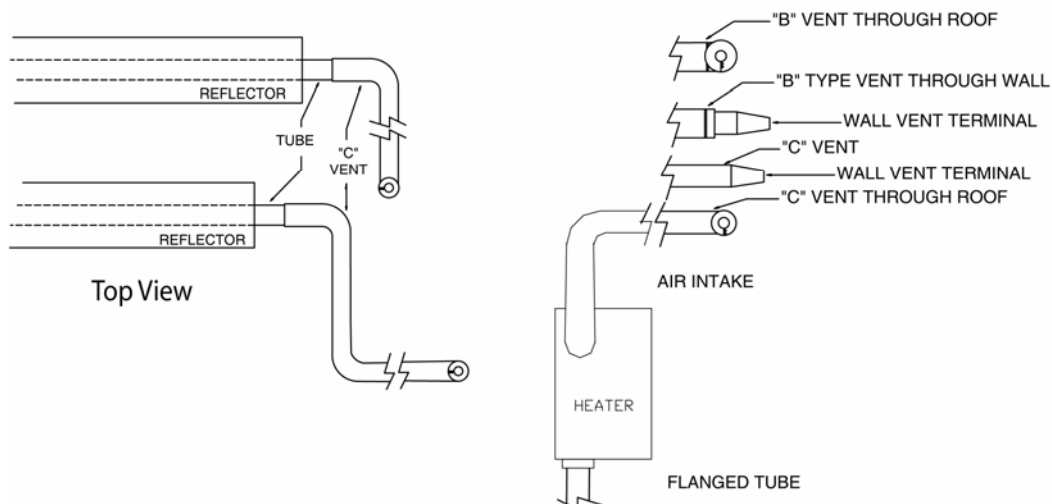
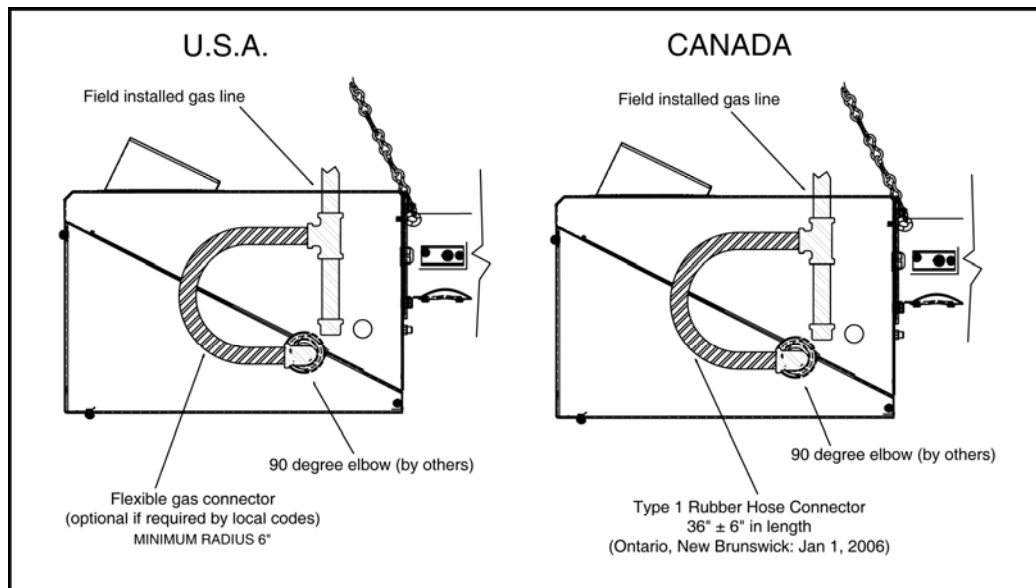
NOTE: Access to the manifold pressure test port is on the top of the valve. A 3/16" Allen Wrench is necessary to check this. When checking or setting the manifold pressure, a **water manometer** should be used. Gauges which measure in

ounces per square inch or pounds per square inch are not accurate enough to properly measure or set the pressure. PLEASE SEE NEXT SECTION ON HEATER EXPANSION.

12. HEATER EXPANSION

The Btu/hr input and the tube length determine the overall expansion that occurs in a tube system. A typical infrared tube installation will expand toward both the Burner and the vent end. In order to address this issue it is suggested that the gas line, flue vent, and combustion air intake (if used) shall be installed in such a manner, that the normal expansion of the heater will be accommodated.

Tube Length in Feet	Btu/hr input rating	Approximate Overall expansion
20 ft	45,000	1"
30 ft	45,000	1 1/4"
20 ft / 30 ft	60,000	1 1/2"



13. ELECTRICAL AND THERMOSTAT WIRING (SEE WIRING DIAGRAM PAGE 22)

Wiring must be done in accordance with local codes. The total load of all heaters must be considered in determining the required contact rating of the controlling thermostat or switch. Each tube heater requires 120V, 60 HZ electrical power sized for 145VA.

The heater can be controlled by the Schwank Tru-Temp Thermostat, a line voltage Thermostat or by an "ON/OFF" switch. Any heater(s) intended for 24v thermostat control must be ordered with the 24v control options.

IMPORTANT:

Do not install the thermostat or sensors in the direct radiant stream.

The voltage at the spark ignition control is 24V. Note that proper functioning of the heater will be adversely affected if the input voltage varies by

more than +/- 10%. Ambient Temperature rating is minus 40°F to plus 175°F (-40°C to +79°C).

WARNING: The heater must be electrically grounded in accordance with the National Electrical Code. ANSi/NFPA 70 or current Canadian Electrical Code CSA C22.1

14. HIGH ALTITUDE INSTALLATIONS

Canada: All of the **STR-JZ** radiant tube heaters are approved for altitudes zero to 4500 feet above sea level and do not require de-rating.

USA: If a heater is to be installed at altitudes above 2000 ft, the input must be reduced by 4% per 1000 ft. If your local utility de-rates the heat

content in the gas supply, no modification of the heater is required. If the gas supply is not de-rated, the orifice must be changed according to the chart shown below. Check with your local utility regarding de-rating of this appliance.

ORIFICE - ALTITUDE CONVERSION CHART

MODEL NO	STD ORIFICE (DMS)	FOR USE AT ALTITUDES ABOVE (FEET)						
		2000	3000	4000	5000	6000	7000	8000
STR-JZ-45N	JS-0729-DM	JS-0729-DM	JS-0730-DM	JS-0730-DM	JS-0730-DM	JS-0730-DM	JS-0731-DM	JS-0731-DM
STR-JZ-45L	JS-0746-DM	JS-0746-DM	JS-0746-DM	JS-0748-DM	JS-0748-DM	JS-0748-DM	JS-0749-DM	JS-0749-DM
STR-JZ-60N	JS-0725-DM	JS-0726-DM	JS-0727-DM	JS-0727-DM	JS-0728-DM	JS-0728-DM	JS-0729-DM	JS-0729-DM
STR-JZ-60L	JS-0742-DM	JS-0742-DM	JS-0743-DM	JS-0743-DM	JS-0743-DM	JS-0744-DM	JS-0744-DM	JS-0745-DM

15. LIGHTING INSTRUCTIONS

Refer to the lighting instructions on the outside cover of the burner housing. Again, if the unit locks out on safety, main power to the unit must be manually interrupted for a 30 second reset period before the heater can be restarted.

NOTE:

On initial installation, the unit may lock out on safety owing to the length of time required to bleed air from the gas piping system.

16. RECOMMENDED MAINTENANCE

1. Prior to each heating season a qualified service agency shall thoroughly inspect the heater, gas and electrical supplies, thermostat connections, the venting and combustion air duct. Worn parts shall be repaired or replaced as required.
2. Check the inlet air opening and the blower periodically, cleaning off any lint or foreign matter, as it is important that the flow of combustion and ventilation air must not be obstructed.
3. Lubricate Blower motor, by adding several drops of oil to oil ports located on the left hand side of the motor.
4. Inspect and ensure that the flame inspection port is clean and free of defects.

THE SCHWANK TUBE HEATER BURNER IS COMPLETELY FACTORY ASSEMBLED AND TESTED. ANY ALTERATION VOIDS THE CSA CERTIFICATION AND MANUFACTURER'S WARRANTY. FOR ADDITIONAL INFORMATION, CONTACT YOUR LOCAL DISTRIBUTOR OR SCHWANK.

17. SEQUENCE OF OPERATION - HONEYWELL S87J-1034

The S87 is powered by a 25v transformer and activated when the thermostat calls for heat. On every call for heat the S87J will delay start-up to provide a 30 second system pre-purge. When the S87 is activated by a thermostat or call for heat an internal transformer provides power to the electronic generator circuit for Spark Ignition and the safety lockout timing begins. At the same time, the S87 opens the gas controls main valve allowing gas to flow to the main Burner.

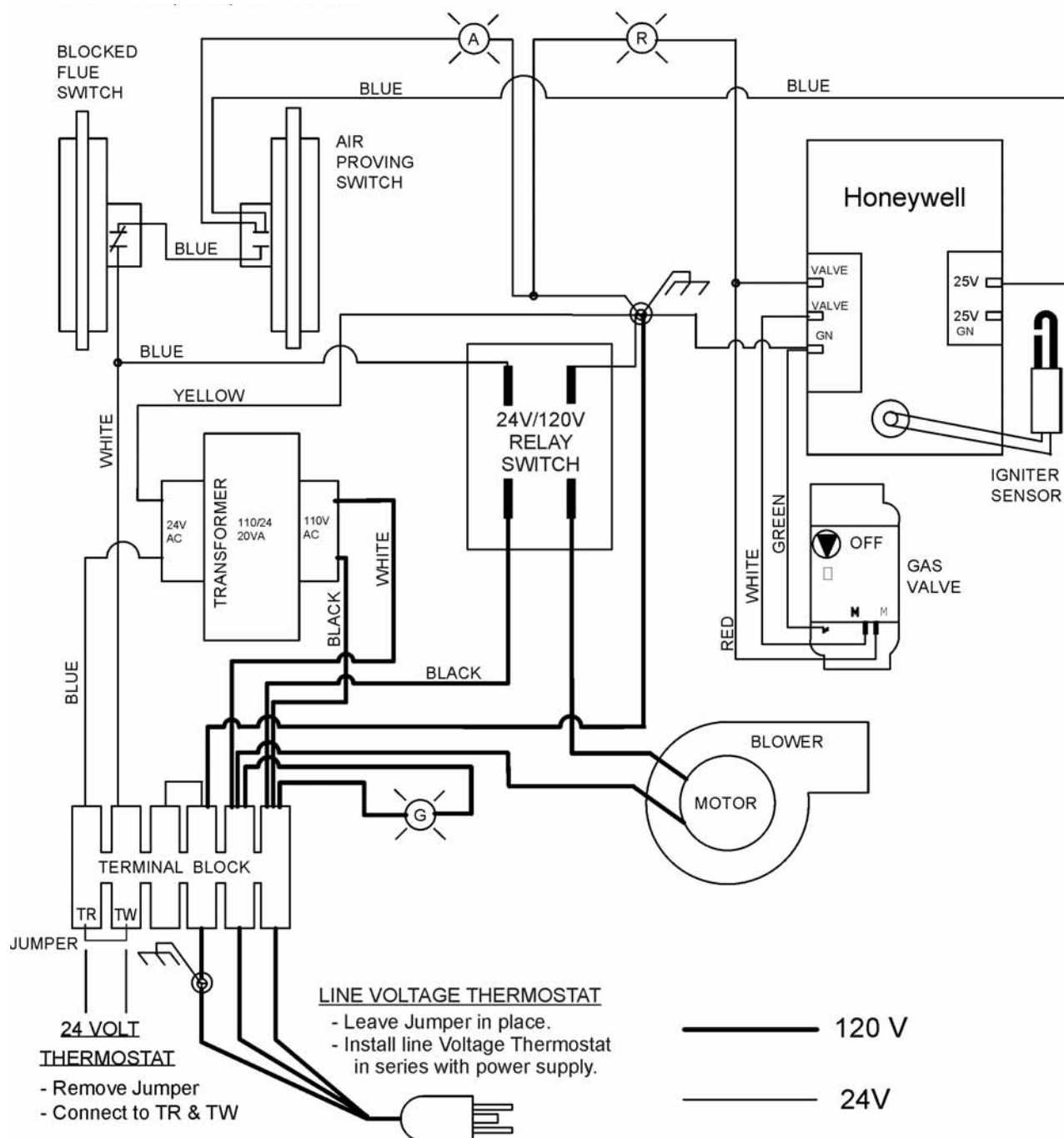
The S87 Control Module performs the following basic functions:

- Provides a 30 second system pre-purge
- Supplies power to the electronic pulse-generator circuit for the Spark Igniter (30,000 volts open circuit).
- Allows 21 seconds for Ignition trial (TFI) before system safety lockout occurs.
- Senses the Burner flame for safe lighting
- Shuts off the spark after the Burner is lit.

The STR-JZ Burner with direct spark ignition, sequence is as follows :

1. Upon a call for heat by the line voltage Thermostat or "ON/OFF" switch, the Blower and the 120/24 volt Transformer are powered simultaneously with 115 volts.
- 1a. **Field installed 24 volt option:**
The 120 volt supply to heater will power the 120v/24v Transformer and the 120V side of the Blower switching relay simultaneously. A call for heat by the 24 volt Thermostat energizes the 24 volt control circuit and the 24v/120 volt relay powering the Blower.
2. The 24 volt control circuit powers the DSI control in series through the normally open Air Pressure Switch (APS) and the normally closed Blocked Flue Switch (BFS).
3. The Blower creates a positive pressure and closes a normally open contact inside the Air Proving Switch (APS).
4. 24 volts supplied to the DSI control initiates the 30 second pre-purge cycle.
5. After completing the 30 second pre-purge cycle the DSI control generates high voltage to the Spark Igniter, and 24 volts to energize the Gas Valve.
6. The Burner will light and establish a steady flame.
7. Once the flame sensor determines there is a steady flame established, with a minimum flame signal of 1.5 uA the spark igniter is then de-energized.
8. In the event ignition does not occur, the safety circuit will function to interrupt gas flow after approximately 21 seconds and lock the system out. No further gas will flow until the power has been manually interrupted for a period of 30 seconds. This will reset the ignition module and the operating sequence will restart at step #1
9. If the blower does not run, the blower air pressure switch (normally open contact) does not close and power is not supplied to the ignition control.

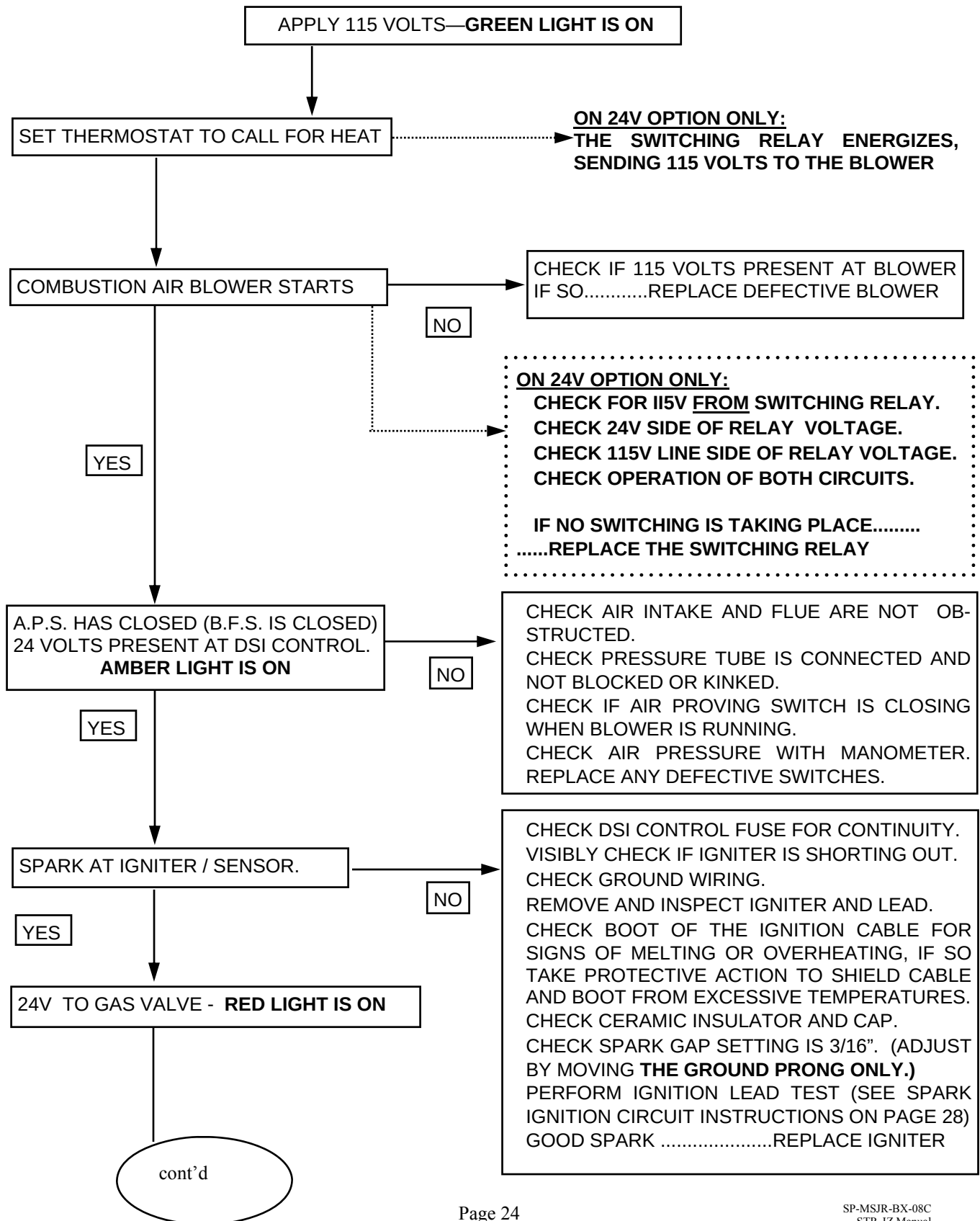
STR-JZ SERIES: WIRING DIAGRAM - HONEYWELL S87J1034

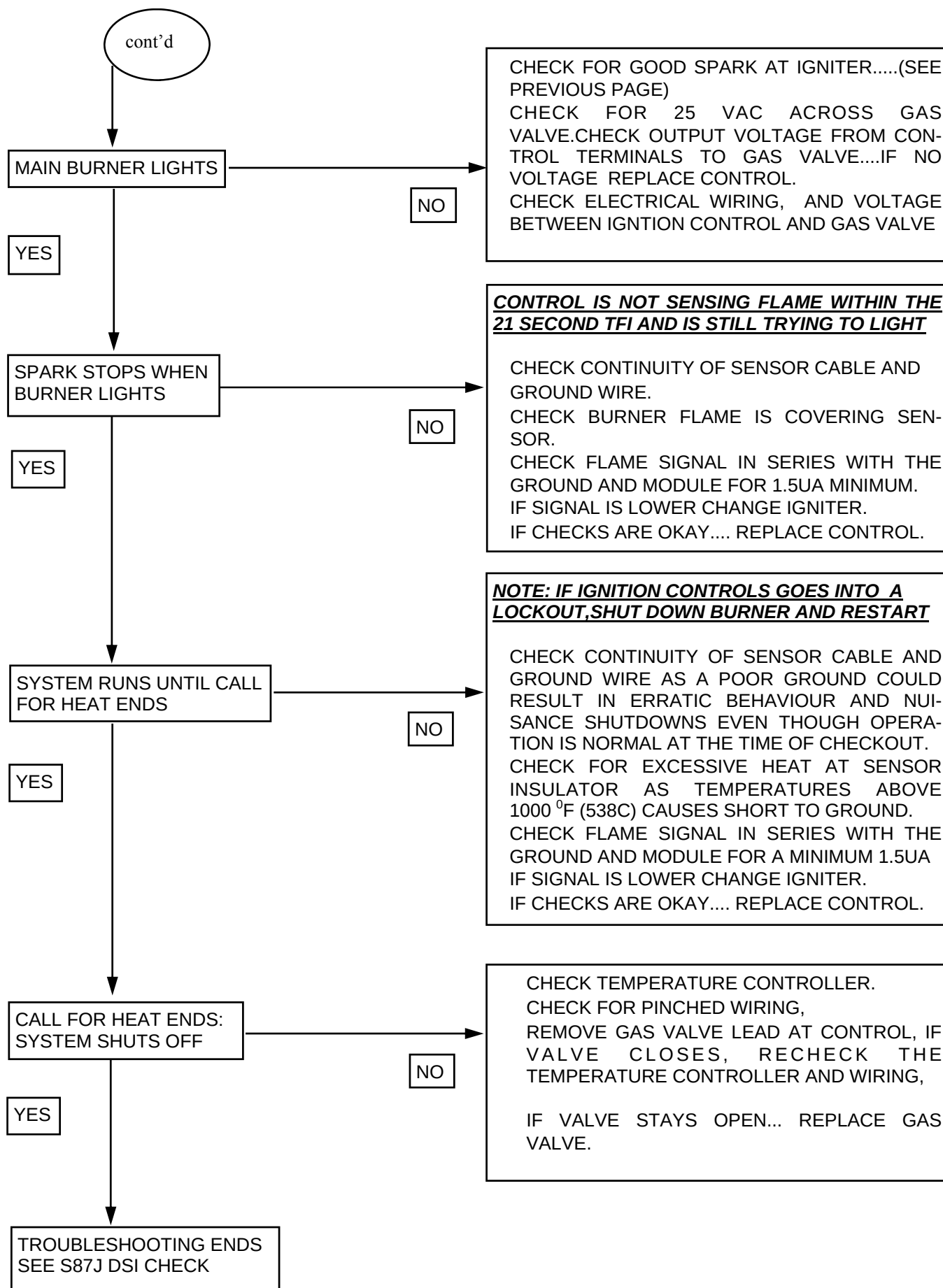


Caution:

Label All Wires Prior To Disconnection When Servicing Controls.
Wiring Errors can cause improper and dangerous operation.
Verify proper operation after servicing.

18. STR-JZ SERIES: TROUBLESHOOTING GUIDE HONEYWELL S87J1034 120V THERMOSTAT





19. SPARK IGNITION CIRCUIT

The step-up transformer in the ignition control provides spark ignition at 30,000 volts (open circuit). To check the spark ignition circuit, proceed as follows.

Shut off gas supply to the gas control

Disconnect the ignition cable at the ignition control stud terminal to isolate the circuit from the Spark Igniter or Igniter / Sensor

Prepare a short jumper lead, using heavily insulated wire such as ignition cable

CAUTION

In the next step, DO NOT allow fingers to touch either the stripped end of the jumper or the stud terminal. This is a very high voltage circuit and electrical shock can result.

Perform this test immediately upon energizing the system before the Ignition Control goes into safety lockout and interrupts the spark circuit. Touch one end of the jumper firmly to the ignition control GND terminal. (DO NOT remove the existing ground lead.) Slowly move the other end of the jumper wire toward the stud terminal on the Ignition Control to establish a spark.

Pull the wire away from the stud and note the length of gap at which spark discontinues.

A spark length of 1/8 in. (3mm) or more indicates satisfactory voltage output. If no arc can be established, or the maximum spark is less than 1/8 in. (3mm), and power to the Ignition Control input terminals was proved, replace the Ignition Control.

Turn off the power and reconnect the Ignition Wire to the Ignition Control stud. Disconnect the Ignition Wire from the Igniter and repeat the steps above by grounding the wire out to the tube body this time. Turn on the power and pull the wire away from the tube and note the length of gap at which the spark discontinues. If there is no spark or weak spark replace the Ignition Wire.

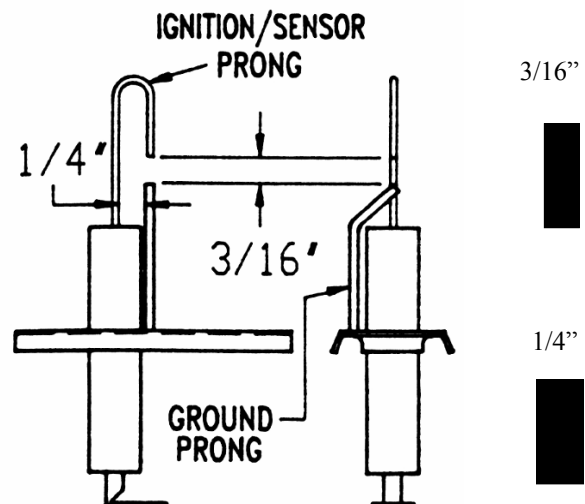
SPARK IGNITER SET UP

Please use the following diagram for checking the Igniter gap.

If the gap is incorrect all adjustments should be made with the **GROUND PRONG/PIN ONLY!**

DO NOT BEND THE IGNITER PRONG!!!!

The black bars located at the lower right corner can be used as a guide for adjustment.

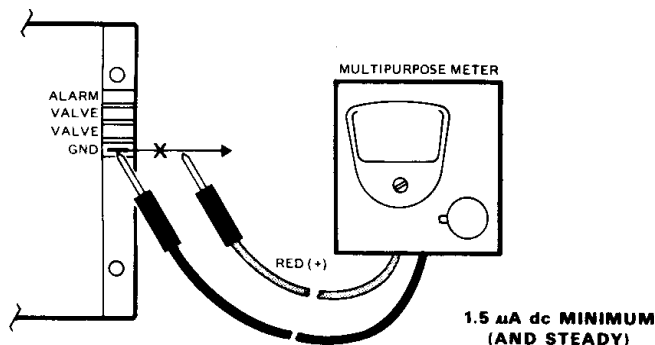


20. FLAME SENSING CIRCUIT

The output of the flame sensing circuit cannot be checked directly on the S87 body. Check the flame sensing circuit directly by checking the flame sensing current from the sensor to the S87 as follows.

1. Connect a meter (dc microammeter scale) in series with the flame signal ground wire as shown below. Using the Honeywell W136A Test Meter or equivalent. Disconnect the ground wire from the S87. Connect the red (positive) meter lead to the free end of the ground wire. Connect the black (negative) meter lead to the quick-connect ground terminal on the S87.
2. Restart the system and read the meter. The flame sensor current must be at least 1.5 uA and steady. If the reading is less than 1.5uA or unsteady, see LOW OR UNSTEADY FLAME CURRENT section, below.

If a flame is present at sensor and a reading of zero uA is obtained, check for a secondary ground connection to the 25V (GND) terminal. If secondary connection exists, temporarily remove connection and measure flame current.



LOW/ UNSTEADY FLAME CURRENT

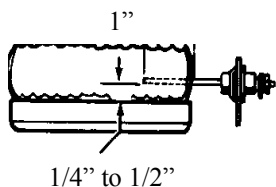
If the current to the S87 flame circuit is less than 1.5 uA or is unsteady, check the burner flame, flame sensor location and electrical connections as follows.

Electrical Connections and Shorts

Connections at the flame sensor must be clean and tight. If wiring needs replacement, use moisture resistant #18 wire rated for continuous duty up to 105° C [221° F].

Flame Sensor

The flame signal is best when about 1 in. [25 mm] of flame rod is immersed in the burner flame. A bent flame rod, bent mounting bracket or cracked ceramic insulator can affect flame signal. Replace flame sensor if necessary.



A good rectifying flame is achieved with approx 1" of sensor in a strong blue flame, positioned 1/4" to 1/2" away from flame source surface.



A lazy or weak flame is not a good rectifying flame. Check gas pressure and gas line/orifice etc for insects and spider cocoons.

Burner Flame

The flame sensor must be constantly immersed in flame. Check burner flame conditions as shown opposite. Observe Burner rating plate for the correct gas pressure, and check it with a manometer. If gas pressure is OK check line and orifice for obstructions.

COMMISSIONING REPORT AS PER I&O MANUAL AND LOCAL CODES

CONTRACTOR NAME: DATE.....

ADDRESS:.....

.....

CITY:.....

PHONE:.....

CELL:

JOB SITE.....CITY.....

HEATER MODEL NUMBER:.....

HEATER SERIAL NUMBER:

**THIS EQUIPMENT HAS BEEN FACTORY FIRED AND TESTED BEFORE DELIVERY, NEVERTHELESS
IT IS NOT A PLUG IN APPLIANCE. IT DOES REQUIRE COMMISSIONING AND FIELD ADJUSTMENTS**

**TO ENSURE THAT SITE CONDITIONS ARE COMPATIBLE WITH THIS HEATER, AND TO
ALLEVIATE NUISANCE CALL BACKS FOR THE CONTRACTOR, THE FOLLOWING
START-UP NEEDS TO BE COMPLETED BY THE LICENSED GAS INSTALLER.**

**A CONTRACTOR IS CALLING FOR TECHNICAL SUPPORT,
MUST PROVIDE THE FOLLOWING INFORMATION
FROM HIS COMPLETED COMMISSIONING REPORT ON NEXT PAGE**

FAX COMPLETED FORM TO TECHNICAL SERVICES: CANADA - 905-712-8336 USA - 706-554-9390

TO BE COMPLETED BY THE LICENSED INSTALLER
TUBE HEATER COMMISSIONING REPORT

TYPE OF GAS:	NG	☐	LP	☐
DOES BUILDING HAVE A NEGATIVE CONDITION:	YES	☐	NO	☐
IF THIS IS A HIGH ALTITUDE AREA WHAT IS THE ALTITUDE ABOVE SEA LEVEL	Feet			
DOES APPLICATION REQUIRE FRESH AIR TO BURNER	YES	☐	NO	☐
IS HEATER EXPOSED TO CHEMICAL OR CORROSIVE ATMOSPHERE:	YES	☐	NO	☐
ARE ACTUAL MINIMUM CLEARANCES AS PER TABLE 3	YES	☐	NO	☐
CAN HEATER BE AFFECTED BY OVERHEAD CRANES / VIBRATION	YES	☐	NO	☐
ARE GAS SUPPLY LINES ADEQUATELY SIZED FOR SYSTEM	YES	☐	NO	☐
GAS LINES AND BRANCHES HAVE BEEN PURGED OF AIR:	YES	☐	NO	☐
THIS HEATER FIRED WITHOUT ANY MALFUNCTION:	YES	☐	NO	☐
INLET GAS SUPPLY PRESSURE WITH HEATER OPERATING :			WC"	
GAS VALVE OUTLET (Manifold) PRESSURE WITH HEATER OPERATING:			WC"	
WHAT IS THE LINE VOLTAGE READING AT THE HEATER			VOLTS	
WHAT IS THE VOLTAGE READING AT THE IGNITION MODULE			VOLTS	
WHAT IS THE FLAME SIGNAL STRENGTH IN uA FROM SENSOR:			uA (microamps)	
IS HEATER CONTROLLED BY A THERMOSTAT	YES	☐	NO	☐
IS THE THERMOSTAT STRATEGICALLY LOCATED	YES	☐	NO	☐
WHAT IS TOTAL LENGTH OF INSTALLED THERMOSTAT WIRE			FEET	
WHAT IS THE GAUGE OF THE THERMOSTAT WIRE			GAUGE	
WHAT IS THE HEATER TUBE LENGTH (10ft per Tube section)			FEET	
WHAT IS THE TOTAL LENGTH OF THE VENT (add 10ft for each bend)			FEET	
WHAT LENGTH IS COMBUSTION AIR INTAKE (add 10ft for each bend)			FEET	
IF REQUIRED....WHAT IS THE LENGTH OF THE TURBULATOR(S)			FEET	
IF INSTALLED....IS TURBULATOR AT FLUE END OF SYSTEM	YES	☐	NO	☐

THIS HEATER MUST HAVE GOOD ELECTRICAL GROUNDING

*** FAX COMPLETED FORM TO TECHNICAL SERVICES: CANADA - 905-712-8336 OR USA - 706-554-9390**

21. OPTIONAL COMPONENTS

Flue Vent Terminals

4" wall horizontal
6" wall horizontal

JA-0528-XX
JA-0529-XX



Flue Vent Terminals

4" roof vertical
6" roof vertical

JA-0530-XX
JA-0531-XX



Torctite Coupler (c/w 2 bolts)

JA-0516-SW



Vent Tee 4" X 4" X 6"
(2 couplers optional)

JA- 0514-XX

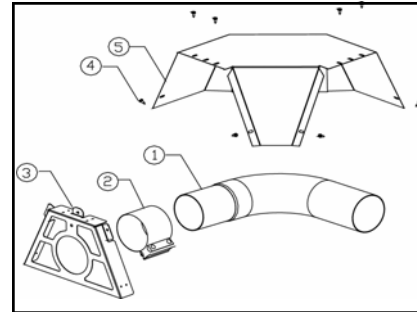


90 degree Aluminized Steel Elbow Kit*

*Kit includes: elbow, coupler, reflector and plate hanger.

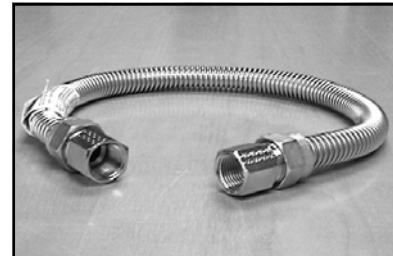
JS-0508-JZ

**For 180 degree Elbow Applications
order 2 x 90 degree Elbow kits.**



Flexible Gas Connector (USA)

Input- 155,000 or less:
JL-0771-FF 1/2"x18"
JL-0771-XX 1/2"x24"



Type 1 Hose Gas Connector (Canada)

JL-0771-RC ⇒ 45 to 155,000 Btuh,
1/2" x 36" Hose
1/2" MPT x 1/2" MPT

JL-0771-RC



#8 Hanging Chain - (box of 50 ft)

JL-0798-JC



Touch Up Paint -
High Temp, 369g aerosol can

JA-0587-XX



Side Reflector Extension Kit -
10" deep, 10 ft long Each

JS-0509-KT



Tube Protection Screen -5 feet long

JA-0780-XX



**FOR GAS-FIRED INFRA-RED LOW INTENSITY TUBE HEATERS: STS-JZ / IQ, STV-JZ / IV, STW-JZ / IW, SPW-JZ / IWP & STR-JZ SERIES**

The Manufacturer warrants that this product is free from defects in material or workmanship under normal use and service subject to the terms of this document.

THREE YEAR WARRANTY

Subject to the conditions and limitations stated herein, during the term of this limited warranty, we will supply any component part (at our option a new or repaired component part) of the heater as defined below, excluding any labor, which the Manufacturer's examination determines to be defective in workmanship or material for a period of three years (3 years) from the date of installation, unless otherwise specified below. This warranty applies to the heater's original owner, and subsequent transferees and only if the unit is installed and operated in accordance with the printed instructions accompanying the unit and in compliance with all applicable installation, building codes and good trade practices. Warranty is only applicable to Schwank components, other parts are limited to their own Manufacturers warranty. (1 year)

TEN YEAR WARRANTY

The Manufacturer warrants the burner sub-assembly comprising of ceramic and immediate metal tubing, and the radiating tubes (excluding couplings) for a period of ten years. (10 years)

WHAT IS NOT COVERED

The Manufacturer shall not be responsible for any expenses, including service, labor, diagnosis, analysis, material or transportation charges incurred during removal or reinstallation of this product, or any of its components or parts. All labor or service charges shall be paid by the owner. This warranty does not cover heating products improperly installed, misused, exposed to or damaged by negligence, accident, corrosive or contaminating atmosphere, water, excessive thermal shock, impact, abrasion, normal wear due to use, alteration or operation contrary to the owner's manual or if the serial number has been altered, defaced or removed. This warranty shall not apply if the input to the heating product exceeds by more than 2% of the rated input on the rating plate. The Manufacturer shall not be liable for any default or delay in performance by its warranty caused by any contingency beyond its control, including war, government restrictions, or restraints, strikes, fire, flood, acts of God, or short or reduced supply of raw materials or products.

WARRANTY PROCEDURE

To establish the installation date for any purpose under this Limited Warranty, you must retain the original records that can establish the installation date of your unit. If you do not provide such documents, the start date of the term of this Limited Warranty will be based upon the date of unit manufacture, plus thirty (30) days. Failure to maintain the equipment through regular annual service maintenance by a qualified service technician shall void the warranty.

LIMITATIONS AND EXCLUSIONS

This document contains all warranties made by the Manufacturer and may not be varied, altered or extended by any person. There are no promises, or agreements extending from the Manufacture other than the statements contained herein. **THIS WARRANTY IS IN LIEU OF ALL WARRANTIES EXPRESSED OR IMPLIED, TO THE EXTENT AUTHORIZED BY THE LAWS OF THE JURISDICTION, INCLUDING SPECIFICALLY THE WARRANTIES OR MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.**

It is understood and agreed that the Manufacturer's obligation hereunder is limited to repairing or replacing parts determined to be defective as stated above. In no event shall the Manufacturer be responsible for any alleged personal injuries or other special, incidental or consequential damages. As to property damages, contract, tort or other claim the Manufacturer's responsibility shall not exceed the purchase price paid for the product.

All replacement parts will be warranted for the unused portion of the warranty coverage period remaining on the applicable unit.

Some Authorities do not allow certain warranty exclusions or limitations on how long a warranty lasts or the exclusions or limitations of incidental or consequential damages. In such cases, the above limitations or exclusions may not apply to you and are not intended to do so where prohibited by law. This warranty gives you specific legal rights. You may also have other rights which vary by each jurisdiction.

5285 BRADCO BLVD. MISSISSAUGA, ON, L4W 2A6
2 SCHWANK WAY, WAYNESBORO, GEORGIA. 30830-8336

SCHWANK
INFRASAVE

Ph: 905-712-4766 Fax: 905-712-8336
Ph: 1-866-INFRASV (463 7278) Fax: 1-866-724-9265

GP-DSTX-BX-02B
JZ Series Warranty
March 2006
RL: 2B
KH